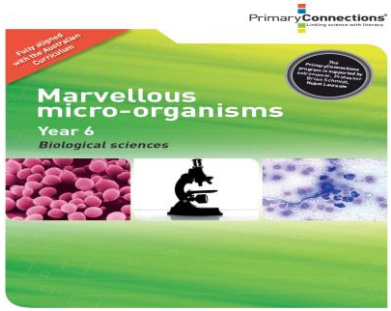
Year 6 Science & Technology Unit 2016
Marvellous Micro-Organisms (*PC*)

Term:	1	2	3	4	Week:	1	2	3	4	5	6	7	8	9	10

UNIT OVERVIEW

The *Marvellous Micro-Organisms* Primary Connections unit provides opportunities for students to develop an understanding of the role of micro-organisms in food and medicine. Students investigate the conditions micro-organisms need to grow, learn about yeast and the bread-making process, and research the development of penicillin.
Some lessons may be adjusted depending on available resources.



UNIT OUTCOMES

Values and Attitudes:
ST3-1VA – shows interest in and enthusiasm for science and technology, responding to their curiosity, questions and perceived needs, wants and opportunities
ST3-3VA – develops informed attitudes about the current and future use and influences of science and technology based on reason

Working Scientifically:
ST3-4WS – investigates by posing questions, including testable questions, making predictions and gathering data to draw evidence-based conclusions and develop explanations.

Working Technologically:
ST3-5WT – plans and implements a design process, selecting a range of tools, equipment, materials and techniques to produce solutions that address the design criteria and identified constraints.

***Knowledge and Understanding:* Physical World**
ST3-6PW – describes how scientific understanding about the sources, transfer and transformation of electricity is related to making decisions about its use

***Knowledge and Understanding:* Earth & Space**
ST3-8ES – describes how discoveries by people from different cultures and times have contributed to advancing scientific understanding of the solar system

***Knowledge and Understanding:* Living World**
ST3-11LW – describes some physical conditions of the environment and how these affect the growth and survival of living things

MATERIALS NEEDED FOR UNIT

RESOURCE SHEETS: ☑
☑ See individual lessons (Primary Connections)

OTHER EQUIPMENT:
- Science Journals, Experiment equipment – see individual lessons

ASSESSMENT

Students will be exposed to a number of different types of assessments during this unit.

☐ **Diagnostic Assessment:** occurs at the beginning of the unit. This assessment is used to elicit students' prior knowledge so that the teacher can take account of this when planning how the unit will progress.

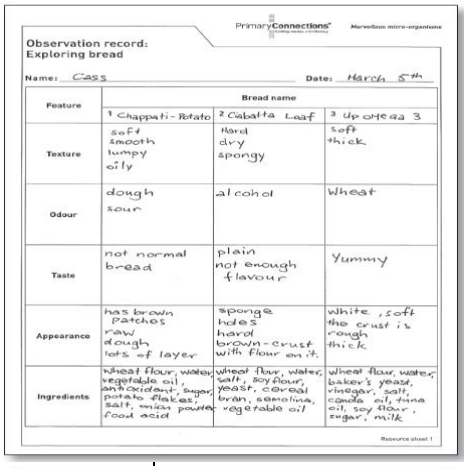
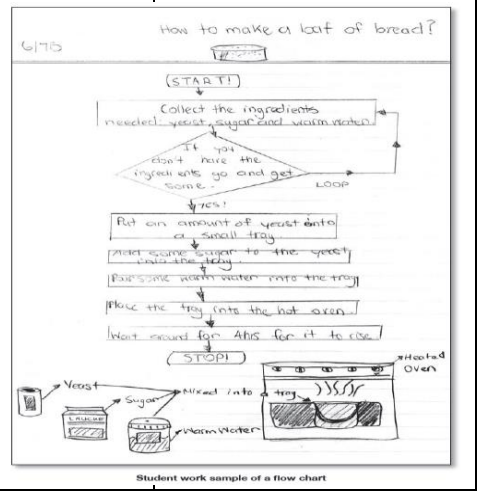
☐ **Formative Assessment:** occurs throughout the unit at various points. This assessment type enables the teacher to monitor students' developing understanding and provide feedback that can extend and deepen students' learning.

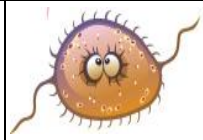
☐ **Summative Assessment:** occurs towards the end of the unit. This assessment type is used determine students' achievement of Science Inquiry Skills and Science Understanding as developed throughout the unit.

ICLT Resources

WEBSITES:
- Seeing the Invisible: https://youtu.be/mTzHxNMK0bU
- Anton van Leeuwenhoek: http://www.famousscientists.org/antonie-van-leeuwenhoek/
- Discovery of Penicillin: https://youtu.be/VGC5JOLQoGo

UNIT AT A GLANCE			
WEEK	**LESSON**	**OVERVIEW OF TEACHING & LEARNING EXPERIENCE**	**ASSESSMENT**
1	**The Y Factor → Exploring Bread**	→discuss understanding and wonderings about micro-organisms →observe, taste and record information about different types of bread →share and discuss observations →use a flow chart to represent what they know about the bread-making process	***Diagnostic Assessment:*** Elicit what students know and understand about: →the growth and survival of yeast and how it's affected by physical conditions of environment →how scientific understanding of micro-organisms and invention affect people's lives →bread-making process in a flow chart
2	**Invention of the Microscope**	read and discuss a factual recount about Anton van Leeuwenhoek →discuss words 'microscope' and 'micro-organism'	
3	**Yeast Feast**	→review what they think they know about yeast →read and discuss a procedural text →observe, record and deduce that yeast produce a gas when mixed with some ingredients	***Formative Assessment:*** Monitor students' developing understanding of: → the growth and survival of yeast and how it's affected by physical conditions of environment →science inquiry skills →how scientific knowledge of micro-organisms affect people's lives → the growth and survival of mould and how it's affected by physical conditions of environment
4	**YEAR 6 CANBERRA EXCURSION** Wednesday 18th May – Friday 20th May		
5	**Putting the Heat on Yeast**	→discuss conditions that promote yeast activity →read and discuss a procedural text →work in collaborative learning teams to investigate the best temperature to support yeast activity	
6	**Knead the Loaf**	→review what they know about yeast →discuss the role of yeast in the bread-making process →observe the bread-making process using a bread machine →generate a flow chart that represents their current understanding of the bread-making process	
7	**Mystery Moulds**	→observe samples of mould →read and discuss an information report about mould	
8	**Investigating Mould**	→work in teams to plan and set up an investigation to determine factors that affect mould growth on food →observe and record the results of their investigations	***Summative Assessment:*** Assess students' ability to: →plan and conduct an open investigation of the conditions that affect mould growth on food →explain that penicillin is made by a mould and is used to treat infections and describe the role of Fleming and Florey in its discovery →represent what they know about micro-organisms, and to reflect on their learning
9	**Medical Micro-Organisms**	→examine the role of Fleming and Florey in the discovery and development of penicillin	
10	**Micro-Organism Experts**	→work in collaborative teams to prepare a presentation on the role of micro-organisms in their lives →make presentations to an audience	

WEEK	LEARNING AND TEACHING ACTIVITIES	ASSESSMENT TASK	EVALUATION	RESOURCES
ONE: **The Y Factor → Exploring Bread** ST3-1VA ST3-4WS	☐ Introduce the unit ☐ Discuss and record what students already know about micro-organisms and any wonderings they have. Record wonderings on cards and display (see attached sheet) ☐ Display a variety of different types of bread, including 1 yeast free (keep packaging). Record names of different types ☐ Discuss reasons why flat bread and high-rise loaf are different using questions like: *'What differences do you notice about these two breads?'* and '*What do you think caused the difference?'* ☐ **Collaborative Learning Group Task:** ○ Introduce team roles ○ Draw attention to equipment table & discuss its use ○ Explain table for recording results (see recording sheet), and discuss the purpose and features of a table to record information ○ Use senses of sight, touch, smell and taste to make observations about 3 different types of bread ○ Record any conclusions ☐ Invite students to make contributions about the role of yeast in the bread-making process and record these under the heading *'What we **T**hink we know*'. Students then suggest questions they can investigate about yeast under the heading *'What we **W**ant to learn'* (for example, what is yeast? How does yeast make bread rise? Why are there holes in bread?) ☐ Introduce concept of a flow chart and jointly develop one about how to make a piece of toast. ☐ Ask students if they have ever made bread or watched it being made ☐ **Pairs:** ○ In science journals students develop a flow chart on how they think bread is made (**NB:** this does not need to be correct. As unit progresses they will learn more about bread-making process) **PLENARY:** ☐ Discuss findings of bread exploration task, focusing on differences especially ones without yeast. Discuss thoughts about what might be involved in the bread-making process ☐ Add new vocabulary to word wall	**Diagnostic Assessment:** →observe, taste and record information about different types of bread →share and discuss observations **Diagnostic Assessment:** →use a flow chart to represent what they think they know about the bread-making process		→Wonder cards →Different types of bread, including 1 yeast-free →Exploring Bread recording sheet →Science journals  Observation record: Exploring bread Name: Cass Date: March 5th Bread name: 1 Chappati - Potato; 2 Ciabatta Loaf; 3 Up and Go 3 Feature / Texture: soft, smooth, lumpy, oily / Hard, dry, spongy / soft, thick Odour: dough, sour / alcohol / Wheat Taste: not normal bread / plain, not enough flavour / Yummy Appearance: has brown patches, raw dough, lots of layer / sponge holes, hard, brown-crust with flour on it / white, soft the crust is rough, thick Ingredients: wheat flour, water, vegetable oil, antioxidant, sugar, potato flakes, salt, raising powder, food acid / wheat flour, water, salt, soy flour, yeast, cereal bran, semolina, vegetable oil / wheat flour, water, baker's yeast, vinegar, salt, canola oil, tuna oil, soy flour, sugar, milk  How to make a loaf of bread? START! Collect the ingredients needed: yeast, sugar and warm water If you don't have the ingredients go and get some. LOOP YES! Put an amount of yeast into a small tray Add some sugar to the yeast Pour some warm water into the tray Place the tray into the hot oven Wait around for 4hrs for it to rise STOP! Yeast, Sugar, Mixed into, tray, Heated Oven, Warm Water Student work sample of a flow chart

 I Wonder…	 I Wonder…	 I Wonder…
 I Wonder…	 I Wonder…	 I Wonder…
 I Wonder…	 I Wonder…	 I Wonder…

Observation record: Exploring bread

Name: _____ **Date:** _____

Feature	Bread name		
	1	2	3
Texture			
Odour			
Taste			
Appearance			
Ingredients			

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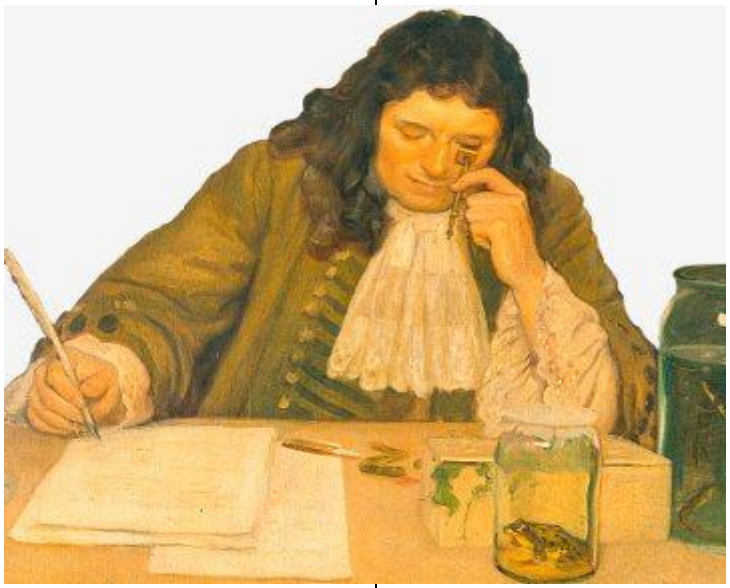
WEEK	LEARNING AND TEACHING ACTIVITIES	ASSESSMENT TASK	EVALUATION	RESOURCES
TWO: **Invention of the Microscope** ST3-1VA ST3-4WS ST3-5WT ST3-8ES ST3-6PW	☐ Display an image and/or real example of a microscope and discuss what students know about it and its purpose ☐ Discuss how there were a number of people who over time helped to develop the microscope, one of them being *Anton van Leeuwenhoek* ☐ Watch ***Seeing the Invisible*** published by New York Times (Link: https://youtu.be/mTzHxNMK0bU) → 6:46 mins ☐ Discuss concept van Leeuwenhoek discovered ☐ Read ***Anton van Leeuwenhoek: Microscope Maker*** to add further information ☐ In Science journals students brainstorm key points about this influential person. ☐ Write the word ***microscope*** on the board and discuss its meaning – record in journals. Repeat for ***micro-organism*** ☐ Record a reflection in Science journals, including new things learnt and interesting facts and perhaps any new questions they have **PLENARY:** ☐ Discuss Anton van Leeuwenhoek's contributions to the microscope and the discovery of micro- organisms ☐ Add new vocabulary to word wall **KLA LINK:** ☑ English – examining a factual recount; identify key pieces of information; understand the background and meaning of key words ***Useful website:** http://www.famousscientists.org/antonie-van-leeuwenhoek/	**Diagnostic Assessment:** →examine key information about an inventor from a range of texts →discuss and record the meanings of the words *microscope* and *micro-organism* 		→microscope → IWB →factual recount text →Science journals

Anton van Leeuwenhoek (Layu–un–hook): Microscope maker

Name: _____ **Date:** _____

Anton van Leeuwenhoek (1632–1723) was born over 350 years ago in Holland. He wasn't a scientist but had a hobby that allowed him to see a world that no one before him had seen.

Leeuwenhoek was a businessman who bought and sold cloth. To look closely at the fibre in the cloth, he used a little hand lens. This hand lens magnified objects only three times but Leeuwenhoek enjoyed using it to look at things in nature or even his own fingerprints. Leeuwenhoek became interested in how the lens was made and he started to grind his own lenses and make his own microscopes. He found that he was very good at making lenses. As a hobby, he made more than 250 simple microscopes. Some of these microscopes could magnify objects 300 times. Leeuwenhoek set out to study as many things as he could find. He looked at the sting of a bee and what mould was like. He looked at blood and thin slices of plants. He looked at a drop of water and discovered little creatures moving in it. He discovered little creatures everywhere. He called them animalcules. He was the first person to see microscopic creatures.

Leeuwenhoek wrote down everything he saw and drew very accurate pictures. He wrote letters to important scientific societies and told the scientists about his discoveries.

At first he wasn't believed. Then the scientists of the Royal Society of London sent an observer to Holland to meet him and to investigate his microscopes. The report was very good and caused such excitement that Queen Anne of England and Czar Peter the Great of Russia visited Leeuwenhoek to see the little creatures. Some years later, Leeuwenhoek was made a full member of the Royal Society of London. Leeuwenhoek never gave up his fascinating hobby. He kept making new discoveries with his home-made microscopes throughout his life. He died in 1723 when he was 91 years old.

Find out more at this website:
www.ucmp.berkeley.edu/history/leeuwenhoek.html

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TENSION
NATIONAL

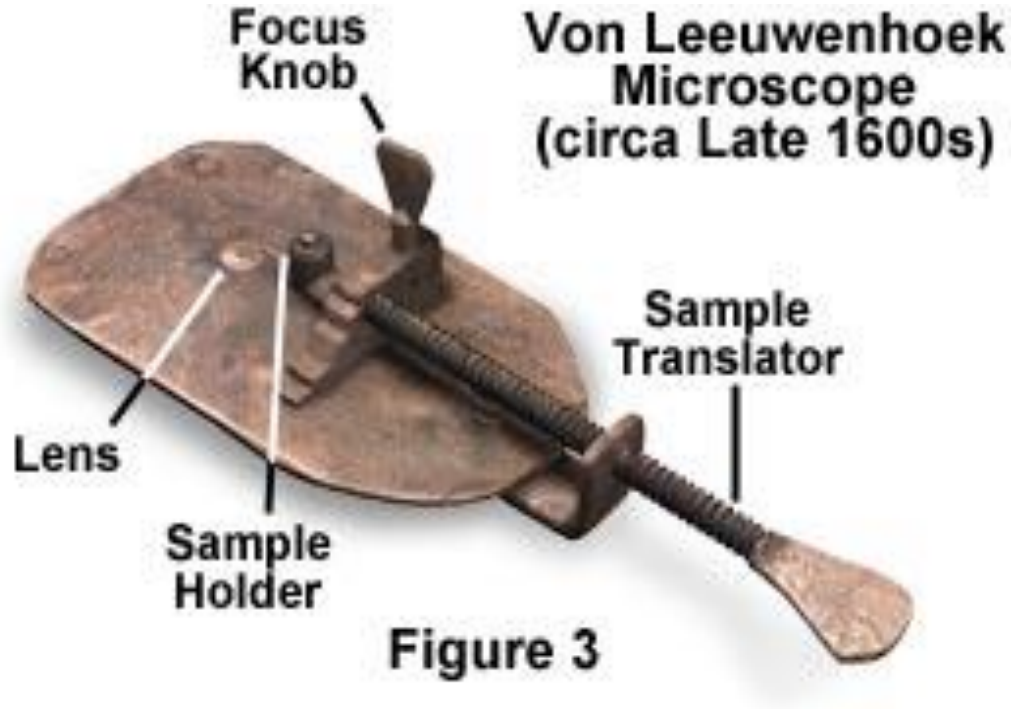
Focus Knob
Von Leeuwenhoek Microscope (circa Late 1600s)
Sample Translator
Lens
Sample Holder

Figure 3

WEEK	LEARNING AND TEACHING ACTIVITIES	ASSESSMENT TASK	EVALUATION	RESOURCES
THREE: **Yeast Feast** ST3-1VA ST3-4WS ST3-5WT ST3-11LW	☐ Review previous learnings about micro-organisms and highlight that yeast is a living micro-organism ☐ Discuss what they think yeast needs to stay alive and record ideas in Science journals and on butcher's paper ☐ **Collaborative Learning Task:** ○ Teams to investigate what happens when yeast is mixed with sugar and water' ○ Read and discuss procedural text ○ Outline the procedure for entering safety zone when collecting warm water ○ Set up investigation and make predictions ○ Set timer for ***1 hour*** and observe experiment. Record observations and any images to support observations **PLENARY:** ☐ Discuss findings of experiment after ***1 hour***. (**NB:** if possible leave experiment overnight and record results again in the morning) ☐ Add new vocabulary to word wall **KLA LINK:** ☑ Mathematics – measuring solids, liquids and gases  Recording observations	**Formative Assessment:** →observe, record and deduce that yeast produces a gas when mixed with some ingredients		→Science journals →butcher's paper →procedural text *'What happens when yeast is mixed with sugar and water?* →4 small plastic bottles →4 balloons →1 funnel →masking tape →labelling pen →rapid rise active dry yeast →sugar →warm water →cup →teaspoon measure (½) →cup measure (¼, ½)

What happens when yeast is mixed with sugar and water?

Name: _____ **Date:** _____

Aim

To find out what happens when combinations of yeast, sugar and water are mixed.

Equipment

- role badges for Director, Manager and Speaker
- each team member's science journal
- 4 small plastic bottles (350–400 ml), all the same size
- 4 balloons
- 1 funnel
- masking tape
- labelling pen
- 3 x ½ teaspoon rapid rise active dry yeast
- 3 x ¼ cup sugar
- 3 x ½ cup warm water (37°C)
- ½ teaspoon measure
- ¼ cup measure
- ½ cup measure

Activity steps

1. Make labels for the four bottles, with your team members' names and the following information:
   - Bottle 1: water + yeast
   - Bottle 2: water + yeast + sugar
   - Bottle 3: water + sugar
   - Bottle 4: yeast + sugar
2. Place the funnel in the mouth of each bottle and add the following ingredients:
   - Bottle 1: ½ cup warm water + ½ teaspoon active dry yeast
   - Bottle 2: ½ cup warm water + ½ teaspoon active dry yeast + ¼ cup sugar
   - Bottle 3: ½ cup warm water + ¼ cup sugar
   - Bottle 4: ½ teaspoon active dry yeast + ¼ cup sugar
3. After you add the warm water, quickly put the opening of the balloon over the mouth of the bottle. Pull the stem part of the balloon down so that it will not come off easily. If it is loose, stick it down with a piece of masking tape to make it airtight.
4. Mix the contents of each bottle gently.
5. Observe the bottles carefully. In your science journal, write and draw what you can see. Write a prediction about what you think will happen to each bottle and balloon over the next hour.
6. Leave the bottles in a warm place for one hour. After an hour, check the bottles and balloons.
7. Record your observations.
8. If possible, leave the experiment overnight and record results again in the morning.

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WEEK	LEARNING AND TEACHING ACTIVITIES	ASSESSMENT TASK	EVALUATION	RESOURCES
FIVE: **Putting the Heat on Yeast** ST3-1VA ST3-4WS ST3-5WT ST3-11LW	☐ Review previous session and reflect on what students know about yeast and temperature ☐ How could we investigate the temperature that best promotes yeast activity? Record ideas and discuss how they can make this a fair test. Encourage to think about testing in cold, warm and hot water. ☐ Read the procedural text ***'What's the best temperature for yeast to be active?'*** ☐ Discuss the safety issues around this activity and develop a class safety plan for using hot water. ☐ **Collaborative Learning Task:** ○ Allocate roles ○ Teams follow the procedural text up to Step 6 ○ Record initial observations and predictions ○ Set timer for 1 hour ○ After an hour check bottles & balloons and discuss and record using words and illustrations their observations. ○ Evaluate what their findings tell them about yeast. ○ (**NB:** if possible leave experiment overnight and record results again in the morning) **PLENARY:** ☐ Discuss observations about experiment. What conclusion about yeast can we draw? Record responses and display. ☐ Add new vocabulary to word wall **KLA LINK:** ☑ English – procedural text	**Formative Assessment:** →discuss conditions that promote yeast activity →investigate and record findings on the best temperature to support yeast activity		→Science journals →butcher's paper →procedural text *'What's the best temperature for yeast to be active?'* →3 small plastic bottles →3 balloons →1 funnel →masking tape →labelling pen →rapid rise active dry yeast →sugar →cold, warm and hot water →cup →teaspoon measure (½) →cup measure (¼, ½)

What's the best temperature for yeast to be active?

Name: _____ **Date:** _____

Aim

To find out what temperature yeast needs to be active and produce a gas.

Equipment

- role badges for Director, Manager and Speaker
- each team member's science journal
- 1 copy of 'What's the best temperature for yeast to be active?' (Resource sheet 4)
- 3 small plastic bottles with caps, all the same size
- 3 balloons
- ½ tsp measure
- ¼ cup measure
- ½ cup measure
- 1 funnel
- masking tape
- labelling pen
- 7 g sachet of active dry yeast (½ tsp per bottle)
- 3 x ¼ cup sugar
- ½ cup hot water (> 50°C)
- ½ cup warm water (37°C)
- ½ cup cold water

Activity steps

1. Make labels for the three bottles, showing your team members' names and the following information:
   - Bottle 1: Hot water
   - Bottle 2: Warm water
   - Bottle 3: Cold water
2. Place the funnel in the mouth of each bottle and add the ½ teaspoon yeast and ¼ cup sugar. Mix the yeast and sugar together.
3. The manager takes bottle 1 to the 'safety zone' where your teacher will carefully add ½ cup hot water to the bottle. Mix it gently.
4. Put the opening of the balloon over the mouth of the bottle. Pull the stem part of the balloon down so that it will not come off easily. If it is loose, stick it down with a piece of masking tape to make it airtight.
5. Repeat this process for the warm water and cold water.

   Note: Your teacher will add the warm water to bottle 2.
6. Carefully observe each bottle and balloon, and record their current appearance in your science journal. Write a prediction about what you think will happen to each bottle and balloon over the next hour.
7. Put the bottles in a warm place and leave for one hour. After an hour, come back to your bottles.
8. Carefully observe each bottle and balloon and record their appearance in your science journal.
9. Discuss your findings with your team. Discuss the question: 'What's the best temperature for yeast to be active and produce a gas?' and record your ideas in your science journal.

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WEEK	LEARNING AND TEACHING ACTIVITIES	ASSESSMENT TASK	EVALUATION	RESOURCES
SIX: **Knead the Loaf** ST3-1VA ST3-4WS ST3-5WT ST3-11LW	☐ Review what students know already about yeast and its role in the bread-making process ☐ Discuss questions about the bread-making process. For example: ○ *What happens in the machine before the bread-making process begins?* ○ *Why does it take over three hours for the machine to make a loaf of bread?* ○ *How does the carbon dioxide gas that the yeast makes stay trapped in the bread?* ○ *What would happen if you left yeast out of the recipe?* ☐ Make bread using bread machine. If possible, make 1 loaf with yeast and 1 without to draw comparisons. ☐ Observe the bread-making process and record observations in Science journals ☐ Review the purpose of our yeast investigations: ○ *What have we been investigating about yeast?* ○ *What does it mean when we say yeast is a micro-organism?* ○ *Is yeast a living thing? How do you know?* ○ *What conditions does yeast need to be active and make carbon dioxide gas?* ○ *What conditions cause yeast to be inactive? How do you know?* ☐ **Independent Task:** ○ Students summarise what they know about yeast and its role in the bread-making process using words, illustrations and a flow chart ○ Use the following questions to help guide summaries: 1. *What do we know about yeast?* 2. *What part does yeast play in bread-making?* 3. *What are the main steps in bread-making?* ☐ Review flow chart from Session One and using a different coloured pen make additions and alterations to the flow chart based on what we have learnt so far (This will allow them to demonstrate new knowledge). **PLENARY:** ☐ Discuss any new and interesting things we have learnt ☐ Add new vocabulary to word wall **KLA LINK:** ☑ English – summary; flow chart **NB:** Keep a sample of bread, double bag it for next lesson	**Formative Assessment:** →discuss the role of yeast in the bread-making process →observe the bread-making process and record observations →summarise and represent their current understanding of yeast and its role in the bread-making process.		→Bread-making machine →bread making ingredients (flour, salt, sugar, butter, yeast, warm water) →Science journals

<table>
<tr><th>WEEK</th><th>LEARNING AND TEACHING ACTIVITIES</th><th>ASSESSMENT TASK</th><th>EVALUATION</th><th>RESOURCES</th></tr>
<tr>
<td><u>SEVEN:</u>

Mystery Moulds

ST3-1VA
ST3-4WS
ST3-5WT
ST3-11LW</td>
<td>
☐ <u>Lesson Preparation:</u> samples of bread, double bagged from previous session
☐ Discuss experiences with mould. Ask and record what they know about mould and any wonderings they have
☐ Examine the purpose and features of a labelled diagram (students will use this in C.L.T)
☐ <u>Collaborative Learning Task:</u>
○ Discuss, observe and record observations about the mould in Science journals
○ Include a labelled diagram
☐ Provide a copy to each student of the information report ‘Moulds’. Highlight any new vocabulary or technical terms. Make a list of all the highlighted words and place a definition beside them (either from a dictionary or an everyday explanation).
<table>
<tr><th>Technical term</th><th>Definition</th></tr>
<tr><td>multiply</td><td>make more of</td></tr>
</table>
<u>PLENARY:</u>
☐ Discussion questions:
○ What did the mould look like?
○ What colours did you see in the mould?
☐ Add new vocabulary to word wall

<u>KLA LINK:</u>
☑ English – information report, new and technical vocabulary

Mould is a fungus micro-organism that grows on many surfaces. Mould reproduce by producing spores. Mould spores are commonly found in the air and soil, but will grow anywhere in the right conditions.
</td>
<td><u>Formative Assessment:</u>
→observe and discuss mould samples
→record observations including a labelled diagram</td>
<td></td>
<td>→mould samples

→Science journals

→microscope
→magnifying glasses

→information report: Moulds
→dictionary</td>
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Moulds

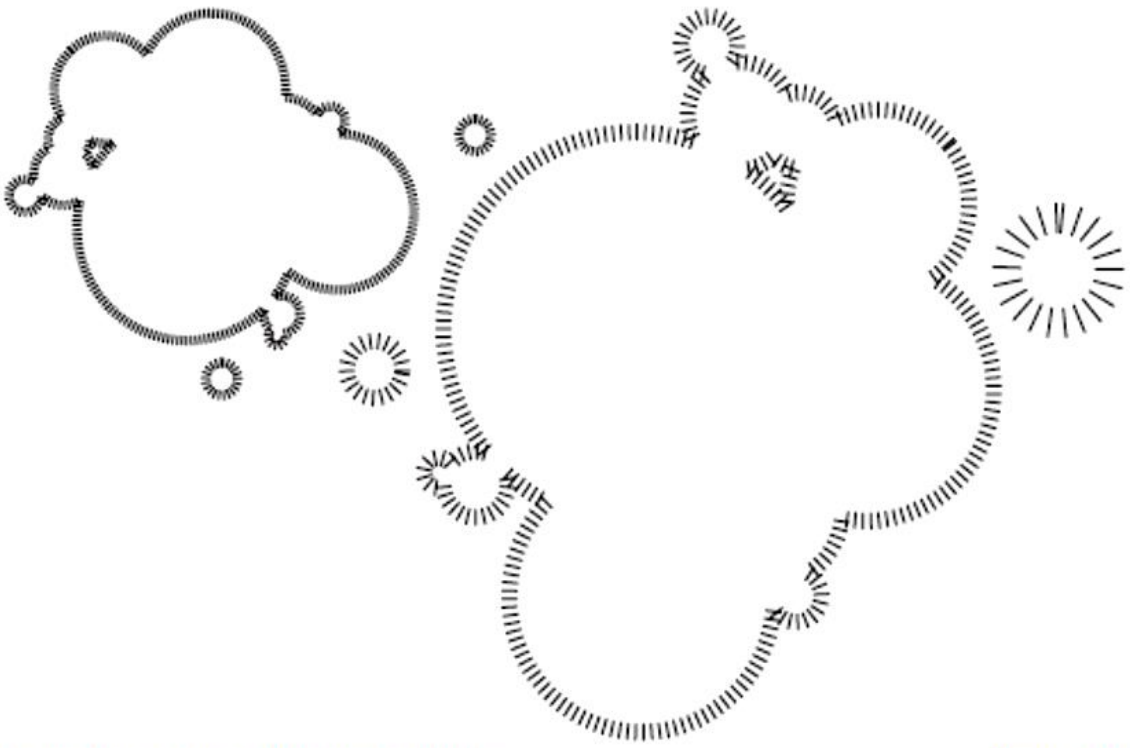
Name: _____ **Date:** _____

Moulds are a type of fungus. They are micro-organisms and are so small that we can only see them with the naked eye when they multiply in numbers. There are many different kinds of mould.

Moulds are usually seen growing on the surface of objects. They are often fluffy or downy in appearance. Moulds can be many colours, including green, blue, brown, orange and yellow.

Moulds play an important role in the environment. They help to break down and recycle dead plant and animal material. This is important because nutrients are returned to the environment for plants and animals to use. This can be seen at home, for example, mouldy fruit in a fruit basket or a fluffy substance growing on an open jar of tomato paste or jam.

Moulds spread by forming reproductive spores that are carried in the air. The air contains mould spores which come from the furry growth visible on the surface of objects. Spores can stay alive for long periods of time in a dormant state until the conditions are right, and then they begin to grow.



WEEK	LEARNING AND TEACHING ACTIVITIES	ASSESSMENT TASK	EVALUATION	RESOURCES
EIGHT: **Investigating Mould** ST3-1VA ST3-3VA ST3-4WS ST3-5WT ST3-11LW ST3-8ES	☐ Pose the following questions: ○ *What things might help mould to grow?* ○ *How could we find out?* And record responses ☐ Introduce the term ***'variables'*** →things that can be changed, measured or kept the same in an investigation. Variables kept the same are known as '***çontrolled***'. ☐ Model the process of writing questions for investigation. For example 1. *What happens to mould growth when we change the amount of moisture?* 2. *What happens to mould growth when we change the temperature?* 3. *What happens to mould growth when we change the amount of light?* ☐ Demonstrate how to use the ***'Mould Growth Investigation Planner'***. For this investigation, students determine what they will: ○ **Change:** e.g. the amount of water ○ **Measure/ Observe:** e.g. the amount of food area covered ○ **Keep the Same:** e.g. temperature, amount of light ☐ **Collaborative Learning Task:** ○ Team decides on a question to investigate ○ Complete the mould growth investigation planner (each) ○ Begin setting up group investigation ○ Record observations using words, measurements and diagrams daily ○ When sufficient mould has grown, groups complete the planning sheet including data sheet ○ Students make a claim (in answer to their investigation question) and discuss with teams **PLENARY:** ☐ Discuss class findings and what this has shown them about micro-organisms in food day and how they can prevent food decay. ☐ Add new vocabulary to word wall **Checklist** ☑ Leave some air in the bag before sealing it ☑ Place the bag inside a 2nd plastic bag and seal the top with tape ☑ Label bag with contents and team names ☑ Use thermometer to check temperature of storage area	**Summative Assessment:** →plan and conduct an investigation of the conditions that affect mould growth on food		→butcher's paper →Science journals →Mould growth investigation planner →thermometer →zip lock bags →tape →2 slices of bread or fruit each group

Mould growth investigation planner

Name: _____ **Date:** _____

Team members' names: _____

What are you going to investigate?	What do you predict will happen? Why?
Can you write it as a question?	Give scientific explanations for your prediction

To make this a fair test what things (variables) are you going to:

Change?	Measure?	Keep the same?
Change only one thing	What would the change affect?	Which variables will you control?

Describe how you will set up your investigation?	What equipment will you need?
Use drawings if necessary	Use dot points

Write and draw your observations in your science journal

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Presenting results

Can you show your results in a graph?									

Explaining results

When you changed ..... what happened to mould growth?	
Why did this happen?	Was your prediction accurate?

Evaluating the investigation

What problems did you have in doing this investigation?	How could you improve this investigation (fairness, accuracy)?

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<tr><th>WEEK</th><th>LEARNING AND TEACHING ACTIVITIES</th><th>ASSESSMENT TASK</th><th>EVALUATION</th><th>RESOURCES</th></tr>
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<td><u>NINE:</u>

Medical Micro-Organisms

ST3-1VA
ST3-3VA
ST3-4WS
ST3-5WT
ST3-11LW
ST3-8ES</td>
<td>
☐ Ask students if they have ever needed to take antibiotics.
☐ Watch the ‘Discovery of Penicillin’ from You Tube → Link: https://youtu.be/VGC5JOLQoGo 11:43
☐ Discuss the key ideas the clip brings forth. Students might like to use their note-taking skills to record key information
☐ ‘Penicillin: The Miracle Mould ’fact sheet can be used to support learning task
☐ <u>Individual/ Paired Learning Task:</u>
○ Draw up a table in their science journals
○ Transform the key ideas into a table that links ideas
<table>
<tr><th colspan="5">The penicillin story</th></tr>
<tr><td>Who are the main characters?</td><td>What did they do?</td><td>Where did it happen?</td><td>When did it happen?</td><td>Why was it important?</td></tr>
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<u>PLENARY:</u>
☐ Discuss why this discovery is so important. What would happen if it had never been discovered?
☐ Add new vocabulary to word wall

<u>KLA LINK:</u>
☑ English – factual recount, summarising using key ideas, new and technical vocabulary
</td>
<td><u>Summative Assessment:</u>
→ explain that penicillin is made by a mould and is used to treat infections and describe the role of Fleming and Florey in its discovery</td>
<td></td>
<td>→IWB

→Penicillin: the miracle mould fact sheet

→Science journals</td>
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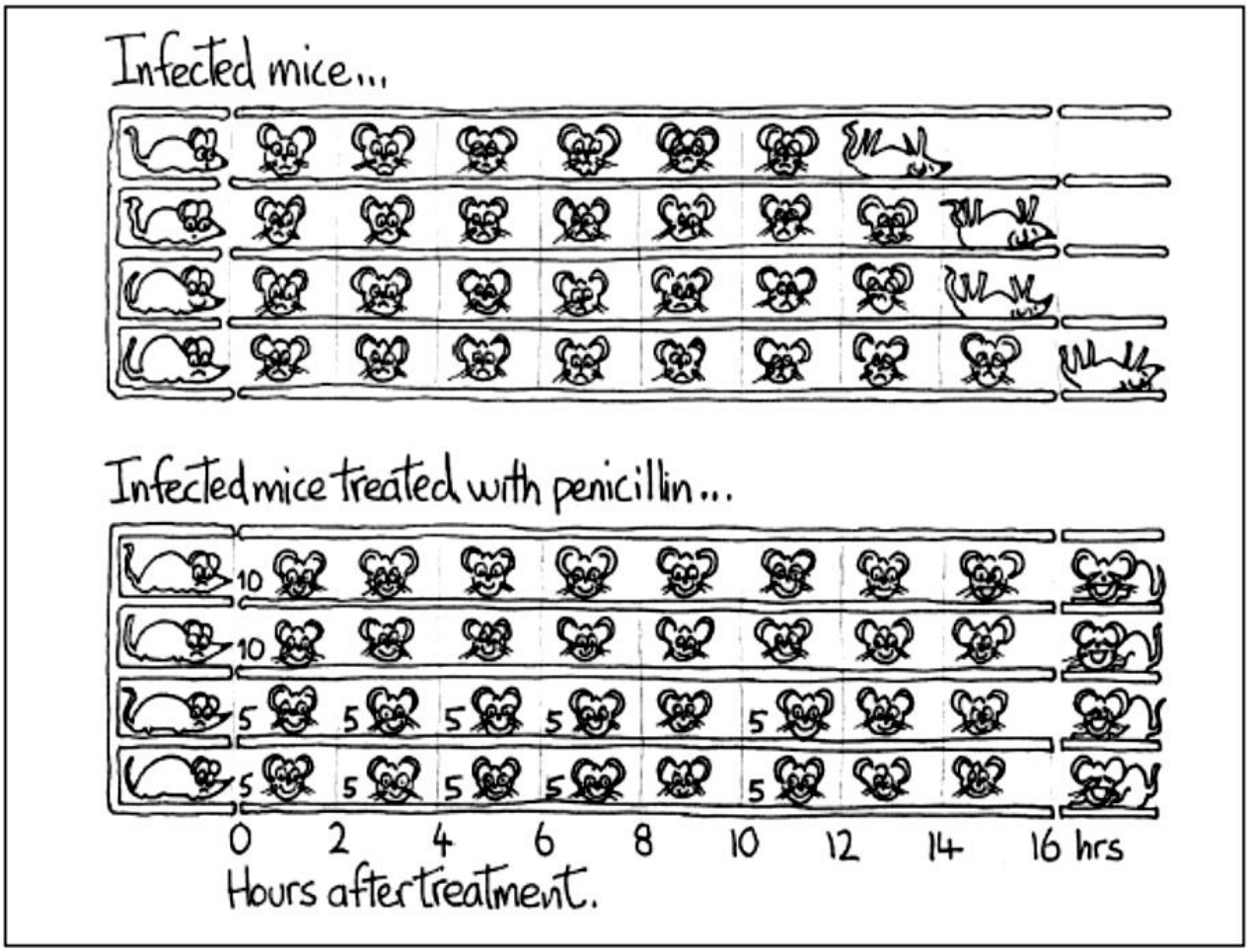
Penicillin—the miracle mould

Name: _____ **Date:** _____

Substances that prevent the growth of germs (bacteria) are called antibiotics. Today, many antibiotics from different micro-organisms are used to treat a variety of infections. The first antibiotic used for medical purposes was penicillin, which is made from a fluffy, blue-green coloured mould called 'Penicillium'.

In 1928 British scientist Dr Alexander Fleming was working at St Mary's Hospital Medical School in London, England. He noticed that a mould had contaminated a dish containing a sample of bacteria he was studying. Dr Fleming observed that the bacteria could not grow in the area around the mould, and published a journal article on his observations in 1929. However, he was unable to isolate the substance that prevented bacteria from growing, and he moved on to other research.

Ten years later, Australian researcher Dr Howard Florey, biochemist Dr Ernst Chain and their team began to look for the substance that Dr Fleming had observed. In 1940 Dr Florey and his team at Oxford University in England infected eight mice with *Streptococcus* bacteria. Four of the mice were treated with injections of penicillin, while the other four were untreated. The next day, the treated mice had recovered while the untreated mice were dead. This experiment demonstrated the potential of penicillin as a treatment for bacterial illnesses.



(Image courtesy of CSIRO, www.csiro.au)

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The results were so exciting that Dr Florey knew it was time to test penicillin on humans. In 1941 Florey's team gave penicillin to a policeman, Reserve Constable Albert Alexander, who was dying from an infection caused by a scratch. He began to recover after being given penicillin, but there was not enough penicillin to see him through to recovery. Unfortunately, the policeman died. Because of this experience, Florey's team worked with sick children who did not need such large amounts of penicillin.

Florey's team became determined to find a way to mass produce the penicillin. Due to World War II, companies in Britain were unable to help with the project, so Florey took his discovery to the United States to develop it. By late 1943 Florey and his team had discovered better methods of producing penicillin and mass production of the drug had begun. The availability of penicillin saved the lives of many Allied servicemen who might otherwise have died of infections from wounds and surgery. However, penicillin does not work against all types of bacteria. After World War II, penicillin became available for civilians (non-service people).

In 1945 Howard Florey, Alexander Fleming and Ernst Chain were awarded the Nobel Prize in Medicine in recognition of their discovery.

Dr Howard Florey

WEEK	LEARNING AND TEACHING ACTIVITIES	ASSESSMENT TASK	EVALUATION	RESOURCES
TEN: **Micro-Organisms Experts** ST3-1VA ST3-3VA ST3-4WS ST3-5WT ST3-11LW ST3-8ES	☐ Collaborative learning teams develop a presentation about the role of micro-organisms in their lives. ☐ Review yeast and mould. ☐ Discuss the type of information students could include in presentations, for example: ○ *What are micro-organisms?* ○ *What conditions do micro-organisms like yeast and mould need to grow?* ○ *What role does yeast play in bread-making?* ○ *How do micro-organisms affect our lives?* ☐ Brainstorm ways groups could present their ideas (speech, multimedia presentation, poster, poem, play, interview ☐ List the type of things that each group needs to include: ○ Well-organised information ○ Evidence of research into topic ○ Evidence of knowledge of the topic ○ Clear oral communication ○ Evidence of collaborative team work ○ Creative presentation ☐ Present presentations to the class **PLENARY:** ☐ Discuss each groups presentations, strengths of the group and areas to improve ☐ Add new vocabulary to word wall **KLA LINK:** ☑ English – presentations	**Summative Assessment:** → represent what they know about micro-organisms, and to reflect on their learning		→Science journals →presentation items

TEAM ROLES

Manager

Collects and returns all materials the team needs

Speaker

Asks the teacher and other team speakers for help

Director

Makes sure that the team understands the team investigation and completes each step

TEAM SKILLS

1 Move into your teams quickly and quietly

2 Speak softly

3 Stay with your team

4 Take turns

5 Perform your role